

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule, said molecule encoding a heterologous stress-responsive protein wherein said nucleic acid molecule comprises a nucleotide sequence selected from the group consisting of:

- 5 (a) a nucleotide sequence comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11,
- (b) a nucleotide sequence comprising at least 20 contiguous nucleotides of the sequence of SEQ ID NOS: 1, 3, 5, 7, 9, or 11, wherein said nucleotide sequence encodes a protein with stress-responsive activity;
- 10 (c) a nucleotide sequence having at least 70% sequence identity to the sequence of SEQ ID NOS: 1, 3, 5, 7, 9, or 11, wherein said nucleotide sequence encodes a protein with stress-responsive activity.

2. A vector comprising the nucleic acid molecule of claim 1.

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3. A plant cell having stably incorporated in its genome the nucleic acid molecule of claim 1.

4. The plant cell of claim 3, wherein said plant cell is from a dicot plant.

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5. The plant cell of claim 4, wherein said dicot plant is soybean.

6. The plant cell of claim 3 wherein said plant cell is a root cell.

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7. A nucleic acid molecule that drives expression of an operably linked nucleic acid sequence in a plant cell, wherein said nucleic acid molecule which drives expression comprises a nucleotide sequence selected from the group consisting of:

- (a) a maize nucleotide sequence natively associated with a GOLS or RAFS encoding nucleotide sequence,
- 30 (b) a nucleotide sequence natively associated with SEQ ID NOS: 1, 3, 5, 7, 9, or 11;

8. A vector comprising the nucleic acid molecule of claim 7.

9. A plant cell having stably incorporated in its genome the nucleic acid molecule of claim 7.

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10. The plant cell of claim 9, wherein the plant cell is from a dicot plant.

11. The plant cell of claim 10, wherein the dicot plant is soybean.

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12. The plant cell of claim 9 wherein said cell is a root cell.

13. A method for conferring or improving stress resistance in a plant, said method comprising:

transforming said plant with a nucleic acid molecule comprising a heterologous sequence operably linked to a promoter that induces transcription of said heterologous sequence in a plant cell in response to a stress stimulus; and

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regenerating stably transformed plants, wherein said heterologous sequence comprises a nucleotide sequence selected from the group consisting of:

(a) a nucleotide sequence comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;

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(b) a nucleotide sequence comprising at least 50 contiguous nucleotides of the sequence of SEQ ID NOS: 1, 3, 5, 7, 9, or 11, wherein said nucleotide sequence encodes a protein with stress responsive activity; and

(c) a nucleotide sequence having at least 70% sequence identity to the sequence of SEQ ID NOS: 1, 3, 5, 7, 9, or 11.

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14. The method of 31, wherein said plant is a dicot.

15. The method of 32, wherein said dicot is soybean.

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16. An isolated polypeptide having stress regulatory-like activity and selected from the group consisting of:

- (a) a polypeptide comprising the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10, or 12;
- 5 (b) a polypeptide encoded by a nucleotide sequence comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;
- (c) a polypeptide comprising an amino acid sequence encoded by a nucleotide sequence deposited as Deposit No. PTA-_____;
- (d) a polypeptide encoded by a nucleotide sequence that has at least 70%
10 sequence identity to the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11.
- (e) a polypeptide comprising an amino acid sequence having at least 50% sequence identity to the sequence set forth in SEQ ID NO:2, 4, 6, 8, 10 or 12; and
- 15 (f) a polypeptide comprising an amino acid sequence of at least 30 consecutive amino acids of any of (a) through (e).

17. An isolated nucleic acid molecule that encodes a polypeptide having GOLS or RAFS-like activity, said nucleic acid molecule being selected from the group consisting
20 of:

- (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10 or 12;
- 25 (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
- (e) a nucleic acid molecule comprising a sequence having at least 70%
30 sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 6, 8, 10, 12, 14, or 16; and

- (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).

18. A nucleotide construct comprising:

- 5 a nucleic acid molecule of claim 35, wherein said nucleic acid molecule is operably linked to a promoter that drives expression in a host cell.

19. A method for modulating a peptide comprising:

transforming a host cell with the nucleic acid molecule of claim 35.

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20. A cell having stably incorporated into its genome at least one nucleotide construct comprising:

a nucleic acid molecule operably linked to a heterologous promoter that drives expression in said cell, wherein said nucleic acid molecule encodes a polypeptide having RAFS or GOLS -like activity and is selected from the group consisting of:

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- (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10, or 12;
- 20 (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
- 25 (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11 ; and
- (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).

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21. The cell of claim 38, wherein said cell is a plant cell.

22. A transformed plant having stably incorporated into its genome at least one nucleotide construct comprising:

a nucleic acid molecule operably linked to a heterologous promoter that drives expression in a plant cell, wherein said nucleic acid molecule encodes a polypeptide having GOLS or RAFS -like activity and is selected from the group consisting of:

- (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10, and 12;
- (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
- (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11; and
- (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).

23. The plant of claim 40, wherein said promoter is a constitutive promoter.

24. The plant of claim 40, wherein said promoter is a tissue-preferred promoter.

25. The plant of claim 40, wherein said promoter is an inducible promoter.

26. The plant of claim 40, wherein said plant is a monocot.

27. The plant of claim 40, wherein said monocot is maize, wheat, rice, barley, sorghum, or rye.

28. The plant of claim 40, wherein said plant is a dicot.

29. Transformed seed of the plant of claim 40.

30. A method for conferring or improving stress resistance of a plant, said method comprising:

5 stably introducing into the genome of a plant, at least one nucleotide construct comprising a nucleic acid molecule operably linked to a heterologous promoter that drives expression in a plant cell, wherein said nucleic acid molecule encodes a polypeptide having GOLS or RAFS -like activity and is selected from the group consisting of:

- 10 (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9 or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10 or 12;
- (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- 15 (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
- (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11; and
- 20 (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).

31. An isolated nucleic acid molecule that encodes a polypeptide having GOLS-like activity, said nucleic acid molecule being selected from the group consisting of:

- 25 (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10 or 12;
- (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- 30 (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);

- (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 6, 8, 10, 12, 14, or 16; and
- (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).
- (g)

32. An isolated nucleic acid molecule that encodes a polypeptide having RAFS-like activity, said nucleic acid molecule being selected from the group consisting of:

- (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS: 2, 4, 6, 8, 10 or 12;
- (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
- (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
- (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 6, 8, 10, 12, 14, or 16; and
- (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).

33. A method for directing raffinose production in a plant, said method comprising:

stably introducing into the genome of a plant, at least one nucleotide construct comprising a nucleic acid molecule operably linked to a heterologous promoter that drives expression in a plant cell, wherein said nucleic acid molecule encodes a polypeptide having GOLS or RAFS -like activity and is selected from the group consisting of:

- (a) a nucleic acid molecule comprising the sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9 or 11;
- (b) a nucleic acid molecule comprising a sequence encoding the amino acid sequence set forth in SEQ ID NOS2, 4, 6, 8, 10 or 12;

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- (c) a nucleic acid molecule comprising a sequence deposited as Deposit No. PTA-_____;
 - (d) a nucleic acid molecule comprising an antisense sequence corresponding to a sequence of a), b), or c);
 - (e) a nucleic acid molecule comprising a sequence having at least 70% sequence identity to the nucleotide sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, or 11; and
 - (f) a nucleic acid molecule comprising a sequence of at least 50 consecutive nucleic acids of any of (a) through (e).